Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Technology Transitions Policy Task Force	)	GN Docket No. 13-5
Potential Trials	)	

COMMENTS OF COMCAST CORPORATION

Comcast Corporation and its affiliates ("Comcast") hereby submit these comments to the Federal Communications Commission ("FCC" or "Commission") in response to the Public Notice released by the Technology Transitions Policy Task Force (the "Task Force") in the above-captioned proceeding.[1]

I. INTRODUCTION AND SUMMARY

The Task Force seeks comment on a number of potential trials, including trials involving interconnection arrangements dedicated to the exchange of Internet Protocol-based ("IP-based") voice traffic and the Next Generation 9-1-1 ("NG911") technology. To the extent that the record demonstrates that the proposed voice over IP ("VoIP") interconnection trials will hasten the ongoing transition from time division multiplexing-based ("TDM-based") networks to IP-based networks for voice services, the Commission should encourage such trials, as they could provide the FCC with useful information. Consistent with its objectives of promoting investment and innovation, however, the Commission should not use the results of these trials to adopt regulations that could limit providers' freedom to experiment with various interconnection arrangements based on their particular technological and economic needs and concerns. The

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[1] *Technology Transitions Policy Task Force Seeks Comment on Potential Trials*, GN Docket No. 13-5, Public Notice, DA 13-1016 (rel. May 10, 2013) ("Public Notice").

marketplace clearly demonstrates that there are numerous methods of successfully achieving IP-to-IP interconnection for voice services.

The technology and service arrangements required to deploy the NG911 service widely are still in development. The trials contemplated in the Public Notice, therefore, would appear to be timely and useful. For example, these experiments would provide the industry and government with relevant information regarding the technical challenges posed by implementing the NG911 architecture on an end-to-end basis as well as potential solutions. To maximize their utility, the NG911 trials should be designed to test the assumptions made in the standards development work the industry has undertaken to date and to ensure that the solutions being developed can be supported by different types of providers across large geographic areas. Again, however, the Commission should ensure that providers retain flexibility in determining how to upgrade their facilities to offer advanced 911 services.

II. THE COMMISSION SHOULD ENCOURAGE TRIALS THAT WILL ACCELERATE THE DEPLOYMENT OF ADVANCED NETWORKS.

As described in the Public Notice, the proposed trials involving VoIP services are designed "to help determine what policies are appropriate to promote investment and innovation while protecting consumers, promoting competition, and ensuring that emerging all-Internet Protocol . . . networks remain resilient."[2] Because an IP-based network architecture can provide numerous pro-consumer benefits, Comcast has long been an advocate of replacing legacy narrowband TDM networks with advanced IP-based technologies. Indeed, Comcast operates its own extensive IP network and is already connecting with other networks for the exchange of voice services on an IP-to-IP basis. If the Commission is persuaded that the trials involving

[2] *Id.* at 1.

VoIP described in the Public Notice would help to move the industry toward the ubiquitous use of IP for voice services, the FCC should encourage such initiatives.

The Commission correctly proposes to limit the scope of the trials to interconnection arrangements dedicated to voice services, and not to the broader array of arrangements that support the exchange of other IP-based traffic.[3] There is no need for a "trial" of the latter, since the exchange of traffic on the Internet has been characterized by decades of "IP-based" connectivity among a broad range of providers using a diverse and dynamic array of peering, transit, and other arrangements. The Internet marketplace has evolved, and continues to evolve, without government intervention, and does not suffer from the same historical or regulatory overhangs that have slowed the evolution of some segments of the legacy voice network. Accordingly, the Commission is correct to focus this proceeding on interconnection arrangements dedicated to the exchange of voice IP services.[4]

III. THE COMMISSION SHOULD MAKE CLEAR THAT THE VOIP TRIALS ARE DESIGNED TO PRODUCE USEFUL INFORMATION, NOT TO FAVOR A PARTICULAR TYPE OF ARRANGEMENT AND PRECLUDE THE EXPERIMENTATION THAT MARKS THE NASCENT IP-TO-IP VOICE MARKETPLACE TODAY.

The VoIP interconnection trials contemplated by the Public Notice will no doubt provide helpful, practical information to the FCC and the industry. For example, they could demonstrate the effectiveness of certain types of interconnection arrangements and highlight the efficiency and other advantages of IP-to-IP interconnection. Further, the proposed trials could illuminate

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[3] *Id.* at 3 ("we emphasize that the trial we propose today does not reach layer-3 peering issues").

[4] That said, Comcast continues to have doubts about the FCC's ability to draw firm lines between interconnection for IP voice and the diverse arrangements that have evolved for the exchange of other Internet traffic (which is necessary to avoid regulatory creep), and about the wisdom of doing so (because doing so could have the effect of freezing in time technological solutions that may not be the most efficient or innovative).

technical or other issues that warrant additional discussion. Comcast believes that they also may help demonstrate that IP interconnection does not fit well within the legacy Title II framework developed for PSTN-based interconnection, given the very different issues, technologies, and geographies it presents.[5]

But the trials will not – and could not – illustrate the only, or the "ideal," or even the preferable form of IP interconnection for voice. Service providers, including Comcast, are employing individualized interconnection arrangements to exchange voice in IP, arrangements that reflect the parties' unique technological, geographic, and economic needs.[6] Yet there is a risk that the selection of certain models for the trials could be seen as an endorsement of those models over the many others that are used in the marketplace – a result that could have a chilling effect on innovation and experimentation. To be sure, the Commission has not suggested that in conducting the trials it is pre-deciding any questions – including the fundamental question of whether regulation is even necessary or what type of regulation might be appropriate if it were. And Comcast applauds that approach. But it will nevertheless be important for the Commission to reinforce that the trials are not meant to epitomize IP-to-IP voice interconnection, or to foreclose other models, and that it understands that there are many other arrangements that will

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[5] The Commission should be especially wary of reflexively applying regulatory models developed for the legacy Title II world to the IP ecosystem. Although some consumer protection rules remain appropriate for an IP world, many of the legacy Title II economic regulations as well as those that dictate the details, forms, and jurisdictional oversight of interconnection and traffic exchanged on the public switched telephone network are fundamentally not applicable to or logical for an IP voice network.

[6] *See, e.g.,* Comments of AT&T, WC Docket No. 10-90, at 10, 20 (Feb. 24, 2012) ("market forces are driving IP networks to negotiate efficient exchanges of 'managed' traffic when necessary"); Comments of Verizon and Verizon Wireless, GN Docket No. 12-353, at 38 (Jan. 28, 2013) ("As more and more services become IP, providers will naturally expand their IP interconnections for voice efficiently, through negotiated agreements by which two willing parties find a match and work out the technical details.").

have to be accounted for and understood if regulation is ever contemplated. If parties fear that the Commission may become wedded to the particular approaches used in the trials, it could chill the industry's ongoing evolution and could undermine the Commission's public interest goal of promoting efficient interconnection arrangements that meet the individual needs of the particular parties involved.[7]

Comcast's real-world experience that it has acquired from negotiating and entering into VoIP interconnection agreements amply demonstrates that there are numerous ways to achieve successful voice IP interconnection arrangements. For example, facilities-based VoIP providers have employed direct IP-to-IP interconnection with full bandwidth, direct interconnection with rate-limited bandwidth, virtual private network interconnection, and multi-protocol label switching interconnection. In other cases, the parties have found it preferable (and satisfactory) to rely on indirect interconnection via a transit provider. Today, negotiating parties are free to agree on the particular engineering and compensation arrangements that are mutually beneficial to both parties.

Similarly, Comcast's experience shows that there are many ways to address technical issues such as "media formats (codecs)," which define the attributes of analog-to-digital conversion, such as frequency range, sampling frequency, bits per sample, and bitrate.[8] Today, VoIP providers are able to experiment with respect to the media format that works best for the

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[7] *See, e.g.,* Reply Comments of AT&T, GN Docket No. 12-353, at 18 (Feb. 25, 2013) ("The relevant technologies are rapidly evolving, and any regulatory intervention at this point would freeze engineering progress in its tracks and consign the industry to inefficient interconnection arrangements based on an incomplete understanding of the technological and economic challenges presented."); Reply Comments of Verizon and Verizon Wireless, GN Docket No. 12-353, at 9 (Feb. 25, 2013) ("[T]here are good reasons to allow the market participants to work through the myriad technical and business issues that are presented by IP interconnection arrangements.").

[8] Public Notice at 5.

networks involved and use the appropriate standard codecs when transcoding is needed. If the industry (or the Commission) fixes on a particular approach to these codecs, even informally, it could effectively force carriers to use a limited number of standards that could no longer easily be modified by the industry – and thus bring to a halt the gradual, iterative evolutionary process that inures to the benefit of both consumers and providers.[9] For example, high-definition voice codecs currently are becoming increasingly popular, and their use provides better sound quality using less bandwidth.[10] Thus, even as the Commission conducts a trial with one approach, the industry might be in the process of evolving – at least for certain types of arrangements – to another. The Commission should make clear that it understands this to be the case.

More fundamentally, of course, Comcast's experience illustrates the reason that prescriptive regulations are inappropriate for this space: IP-based interconnection arrangements, even for voice, are far more dynamic and innovative than their PSTN-based precursors, and today's nascent arrangements are the result of experimentation that the Commission should encourage – a goal that is at odds with prescriptive regulation that can freeze certain approaches

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[9] *See, e.g.,* Reply Comments of CenturyLink, GN Docket No. 12-353, at 14 (Feb. 25, 2013) ("[I]ndustry standards and practices will continue to develop and evolve as providers gain experience with IP-to-IP voice interconnection. During this period of experimentation and evolving standards, premature regulatory mandates threaten to calcify inefficient interconnection arrangements and arrest the ongoing innovation that characterizes the Internet ecosystem.").

[10] *See,* Jeffrey Rodman, *VoIP to 20 kHz: Codec Choices for High Definition Voice Technology*, Polycom, at 10 (July 2008), http://docs.polycom.com/global/documents/whitepapers/codecs_white_paper.pdf (generally discussing wideband-capable codecs); *Enabling Better Voice Quality*, TurboBridge HD Audio Conferencing (last viewed July 3, 2013), http://www.turbobridge.com/about_hd.html (HD voice codec "G.722 provides a far superior audio sound with no noticeable latency, delivering a more natural conversation, with better clarity"); Garrett Smith, *HD Voice? HD VoIP?*, Bandwidth.com Blog (Sept. 1, 2009), http://bandwidth.com/blog/2009/09/garrett-smith-wideband-hd-future-of-telephony/ ("G.722, the most popular and widely used Wideband telephony codec, captures the sound spectrum up to 7,000 Hz . . . the average cellular or PSTN call only captures the sound spectrum between 300 – 3,300 Hz.").

in stone and deter innovation. Of course, the Commission need not tackle that broader question today – but it should make clear that, in selecting certain models for the trials, it is *not* prejudging or precluding in any way the multitude of other options that the market may develop in the future.

IV. THE COMMISSION SHOULD PROCEED WITH THE PROPOSED NEXT GENERATION 9-1-1 TRIALS.

Comcast has been and continues to be an active participant in the development of NG911 and agrees that the advanced technology "promises to . . . create 911 services that are more resilient and cost-effective, offer additional capabilities . . . , and better meet the needs of people with disabilities."[11] To date, however, "there are no fully enabled NG911 systems yet operating."[12] Because the proposed trials appear likely to contribute to the timely deployment of the NG911 architecture, Comcast urges the Commission to move forward with its plan to "deploy an 'all-IP' NG911 service on an accelerated basis in a number of geographic areas where public safety authorities are ready to deploy NG911 for one or more [public safety answering points ("PSAPs")]."[13]

The industry has focused a large portion of its initial efforts on developing and implementing the NG911 systems that will give PSAPs the ability to "work together cooperatively in ways that the current systems do not allow, including interoperability between other PSAPs, response agencies, and applications."[14] While these systems clearly are an

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[11] Public Notice at 6.

[12] Federal Communications Commission, *Legal and Regulatory Framework for Next Generation 911 Services: Report to Congress and Recommendations*, at 3.1.2 (Feb. 22, 2013), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-319165A1.pdf ("FCC NG911 Report").

[13] Public Notice at 7.

[14] National Emergency Number Association Operations Committee NG Requirements Work Group, *NG9-1-1 Systems and PSAP Operational Features and Capabilities Requirements*,

essential element of the broader NG911 infrastructure, information gleaned from implementing systems that ensure PSAP-to-PSAP interconnection and interoperability likely will not solve other "technical and process" issues associated with implementing an end-to-end NG911 architecture.[15] As a result, the documentation and data that the Commission obtains from the trials could prove to be a particularly useful resource for individual originating service providers as they work to make the modifications to their networks that are needed to deploy NG911.

In order to maximize their utility, the Commission should design the trials in a manner that builds upon the industry's existing framework. While, as noted above, the industry's work has not yet been completed, the trials should serve to test the assumptions already made as part of the ongoing standards development process. To the extent possible, the Commission should evaluate these assumptions across a broad range of potential operating conditions to ensure that they will remain valid during the nationwide deployment of NG911 by all providers. For example, the Commission should make certain that various types of originating service providers – including providers of VoIP, wireless, and wireline services – participate in the trials. The trials also should include multiple geographic areas in order to confirm that a provider can successfully deploy the same NG911 solution to multiple states and PSAPs.

Again, however, the Commission should ensure that the trials do not become an ultimatum that forecloses other avenues or alternatives. To the extent that the Commission may use data obtained from the trials to consider the adoption of new regulations to govern the provision of NG911 services, the FCC should ensure that service providers retain ample

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at 6 (June 14, 2011), http://c.ymcdn.com/sites/www.nena.org/resource/collection/2851C951-69FF-40F0-A6B8-36A714CB085D/NENA_57-750_NG9-1-_System_and_PSAP_Operational_Features_and_Capabilities_Requirements.pdf.

[15] Public Notice at 7 (seeking comment on "the technical and process issues that should be covered by a [NG911] trial and on how best to structure a trial to gather data on these issues").

flexibility to determine the manner in which they upgrade their networks and facilities to accommodate the NG911 architecture. NG911 is a standards-based system that is premised on supporting "many more modes of emergency communication than the voice-centric legacy system" as well as additional originating service providers and new technologies.[16] Indeed, one of the primary potential benefits of the transition to NG911 is "greater flexibility,"[17] including "enhanced flexibility . . . in network design."[18] The Commission, accordingly, should make certain that any new regulatory requirements preserve that flexibility.

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16 FCC NG911 Report at 3.1.2; *NG9-1-1 Project*, National Emergency Number Association (last viewed July 5, 2013), http://www.nena.org/?NG911_Project. *See also* Communications Security, Reliability and Interoperability Council, *Working Group 4B Transition to Next Generation 9-1-1 Final Report*, at 5.1.1.2 (Mar. 2011), http://transition.fcc.gov/pshs/docs/csric/CSRIC-WG4B-Final-Report.pdf (noting the various categories of originating service providers and indicating that "[e]ach category of OSP will migrate to next generation networks as appropriate standards are developed and individual company business drivers support the migration"); *Next Generation 9-1-1: The Approach*, U.S. Dep't of Transportation, Research and Innovative Technology Administration (last viewed July 5, 2013), http://www.its.dot.gov/ng911/ng911_approach.htm (noting that the goal of the NG911 initiative was "to provide a system that is capable of providing a wider range of voice, data, and video transmission from different types of communication devices *into* the [PSAPs] and onto emergency responder networks") (emphasis added).

17 Transportation Safety Advancement Group, *Next Generation 9-1-1 What's Next Forum Report from Law Enforcement, Fire-Rescue, Emergency Medical Services and Transportation Operations Stakeholders Panels*, at 3 (Aug. 30, 2011), http://www.tsag-its.org/docs/2011/08/NG9-1-1%20WN%20Report%20-%20August%2030,%202011.pdf.

18 FCC NG911 Report at 3.1.2.

V. CONCLUSION

For the foregoing reasons, the Commission should encourage initiatives that will promote the ongoing transition to an all-IP world for voice services. Importantly, however, the results of any VoIP trials it implements should not be used as the basis for a unitary, prescriptive regulatory approach to IP interconnection for voice service. The Commission should also authorize the NG911 trials described in the Public Notice.

Respectfully submitted,

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July 8, 2013

Certificate of Service

I hereby certify that on this 8th day of July, 2013, I caused a true and correct copy of the foregoing Comments of Comcast Corporation to be mailed by electronic mail to Best Copy & Printing, Inc., at fcc@bcpiweb.com.

/s/ Ruth E. Holder
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